

REMARKS/ARGUMENTS

Claims 10, 11, 13-18, and 20-27 are pending in the Application. No amendments are presented. Applicant respectfully requests reconsideration of the final rejections in the Office Action dated January 27, 2010 (OA).

Rejections of Claims 10-11, 13-18, and 20-27 Under 35 U.S.C. 112, 1st ¶

Previously presented Claims 10-11, 13-18, and 20-27 stand finally rejected under 35 U.S.C. 112, 1st ¶, as based on a Specification which purportedly lacks an adequate written description of the subject matter previously presented. The Examiner criticizes Applicant's use of the phrase "free radically polymerizable unsaturated group" stating (OA, p. 2, ¶3):

While there is support for "free radically polymerizable double bonds", there is no support for the broad "unsaturated group" in the originally filed claims and specification.

First, the criticized phrase is taken out of context. The complete phrase utilized in both Claim 10 and Claim 25 is "the multifunctional macromonomer has a polymerizable content of at least one free-radically polymerizable unsaturated group selected from the group consisting of an acrylate group, a methacrylate group, a maleate group, a vinyl ether group, a vinyl group, and an allyl group." The free-radically polymerizable unsaturated group is defined in both claims as selected from the group consisting of an acrylate group, a methacrylate group, a maleate group, a vinyl ether group, a vinyl group, and an allyl group. Support for "multifunctional macromonomers . . . [comprising] at least one free-radically polymerizable group selected . . . from acrylate, methacrylate, maleate, vinyl ether, vinyl and allyl groups" is found in the Specification at page 3, lines 10-14. Thus, all the multifunctional macromonomers have a polymerizable content of at least one free-radically polymerizable group selected from the group consisting of an acrylate group, a methacrylate group, a maleate group, a vinyl ether group, a vinyl group, and an allyl group whether of not

the free-radically polymerizable groups are labeled double bonds or polymerizable unsaturated groups.

Second, while the Specification at page 3, lines 14-15, identifies the polymerizable groups of the macromonomers as groups containing double bonds, the Specification at page 3, lines 23-27, teaches that the polymerizable groups of the macromonomers are polymerizable unsaturated groups because the “macromonomers are obtainable . . . by condensation of at least difunctional polyols . . . with ethylenically unsaturated carboxylic acids” (emphasis added). The Specification also teaches at page 3, lines 29-32 (emphasis added):

Examples of ethylenically unsaturated C₃ to C₅ carboxylic acids are for example acrylic acid, methacrylic acid, crotonic acid, maleic acid, ethylacrylic acid and vinylacetic acid Preferred polycarboxylic acids are unsaturated C₄ to C₃₆ dicarboxylic acids

Moreover, the Specification expressly states that the polymerization of the macromonomers comprising multifunctional groups results from “polymerization of ethylenically unsaturated compounds by decomposing into free radicals on heating” (Spec., p. 5, ll 32-38).

Based on the teachings of the originally-filed Specification as a whole, it reasonably would have been apparent to any person having ordinary skill in the art that Applicant had possession of the invention defined by current Claims 10 and 25 including a multifunctional macromonomer having a polymerizable content of at least one residual free-radically polymerizable unsaturated group selected from the group consisting of an acrylate group, a methacrylate group, a maleate group, a vinyl ether group, a vinyl group, and an allyl group at the time the Application was filed. To satisfy the written description requirement of 35 U.S.C. § 112, 1st ¶, the supporting specification must “reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention” (OA, p. 2, ¶ 2). See *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991)(the specification must convey with reasonable clarity that the applicant

invented the subject matter claimed). The key phrase used in *Vas-Cath* is “reasonably convey”. *Id.* In view of Applicant’s originally filed Specification, the Examiner’s finding that the written description requirement of the first paragraph of 35 U.S.C. 112 is not satisfied for Applicant’s previously presented Claims 10-11, 13-18, and 20-27 is unreasonable, is clearly erroneous, and should be withdrawn.

Rejections of Claims 10-11, 13-14, and 21-24 under 35 U.S.C. 103 over Arkens

Previously presented Claims 10-11, 13-14, and 21-24 were finally rejected under 35 U.S.C. 103 over Arkens (U.S. Patent 5,661,213, issued August 26, 1997)(OA, p. 3, ¶4). The rejection should be withdrawn.

Arkens’ invention is directed to a “curable aqueous composition containing a polyacid, a polyol and a phosphorous-containing accelerator” (Arkens, Abstract; col. 2, ll. 58-62). The curable composition may be used as a binder for nonwoven fibers such as fiberglass (Arkens, Abstract; col. 2, ll. 55-58). However, the Examiner erroneously finds that the polyacid “addition polymer must contain at least two carboxylic acid groups such as (meth)acrylic acid, anhydride groups or salts thereof (column 4, lines 1-2)” (OA, p. 3; emphasis added). The polyacid component in Arkens’ curable composition may indeed be a polymeric polyacid formed by polymerization of at least one ethylenically unsaturated carboxylic acid monomer (Arkens, col. 3, ll. 53-59), and the at least one ethylenically unsaturated carboxylic acid monomer which was polymerized to form Arkens’ polymeric polyacid component may have been a (meth)acrylic acid (Arkens, col. 4, ll. 1-12). Nevertheless, the polymeric polyacid component of Arkens’ curable aqueous composition containing a polyacid, a polyol and a phosphorous-containing accelerator does not contain at least one residual free-radically polymerizable unsaturated group selected from the group consisting of an acrylate group, a methacrylate group, a maleate group, a vinyl ether group, a vinyl group, and an allyl group. Arkens’ polyacid is a polymeric polyacid. Arkens’

polymeric polyacid is a “polymer formed from at least one ethylenically unsaturated monomer” (Arkens, col. 3, ll. 57-59). Even though Arkens’ polymeric polyacid may be prepared by well-known solution polymerization, emulsion polymerization, or suspension polymerization techniques for polymerizing ethylenically-unsaturated acid monomers such as acrylic acid (Arkens, col. 4, ll. 59-62), Arkens’ polymeric polyacid does not contain a polymerizable content of polymerizable unsaturated groups. Arkens’ polymeric polyacid component is formed by free-radical polymerizing unsaturated carboxylic acids (Arkens, col. 4, ll. 2-20).

That Applicant’s interpretation is true is evident from the fact that Arkens’ preferred polymeric polyacid is polyacrylic acid. Polyacrylic acid does not contain a polymerizable content of unsaturated groups once polymerized. See Arkens’ Examples 1-8, 10-14, and 16-18, all of which utilize polyacrylic acid as the polymeric polyacid component of Arkens’ disclosed curable composition. Arkens does not teach or reasonably suggest that the polymeric polyacid which is prepared by polymerization of an unsaturated acid monomer contains unreacted unsaturated double bonds in an amount sufficient for additional free-radical polymerization. Persons having ordinary skill in the art would have had no reason to suspect that Arkens’ polymeric polyacid contains residual unreacted unsaturated groups in an amount sufficient for radical polymerization. To the contrary, Applicant’s Specification teaches that from about 0.1 to 1.0 moles of unreacted polymerizable double bonds are generally required per 100g of macromonomer for free-radical polymerization of the macromonomer via unreacted polymerizable double bonds. See Applicant’s Specification at page 3, lines 1-21.

The thermally polymerizable mixtures employed in Applicant’s claimed method are polymerizable mixtures comprising a multifunctional macromonomer which has a polymerizable content of polymerizable unsaturated groups. Applicant’s polymerizable

mixture is thermally polymerized or cured via the polymerizable unsaturated groups in the multifunctional macromonomer. Arkens' curable compositions comprise a curable composition comprising a polyacid component, a polyol component, and a phosphorous-containing accelerator. Arkens' polyacid polymers are cured by the reaction of a polymeric polyacid with a polyol in the presence of a phosphate-containing accelerator. Arkens' curing process does not involve polymerizable unsaturated groups at all. Accordingly, persons having ordinary skill in the art would have had no reason to expect or want Arkens' polymeric polyacid component to have a "polymerizable content of at least one free-radically polymerizable unsaturated group selected from the group consisting of an acrylate group, a methacrylate group, a maleate group, a vinyl ether group, a vinyl group, and an allyl group" as Applicant's claims require.

The Examiner appears to agree that Arkens does not teach or reasonably suggest contacting a fibrous and/or granular substrate with a polymerizable mixture of a multifunctional macromonomer having a polymerizable content of polymerizable unsaturated groups selected from those identified in previously presented Claims 10 and 25 and a free-radical initiator. The Examiner acknowledges (OA, p. 4, 2nd full ¶):

Arkens et al fail to disclose impregnating and/or coating fibrous and/or granular substrates with polymerizable mixture comprising multifunctional macromonomer having a polymerizable content of polymerizable unsaturated group and a free-radical initiator

However, because the fibrous substrate is similar and was impregnated by a curable mixture comprising a curable polymeric material, the Examiner argues that the process Applicant claims generally would have been prima facie obvious to persons having ordinary skill in the art (OA, p. 4-5, bridging ¶):

. . . to coat/impregnate the substrate with polymerizable mixture of Arkens prior to complete polymerization (i.e. polymerizable mixture comprises polymerization initiator and multifunctional macromonomer having a polymerizable content of at least one free-radically polymerizable unsaturated group) because it is well known

from prior art that fiber materials can be impregnated with prepolymers (i.e. reads on multifunctional macromonomer) . . . absent evidence of unexpected results.

It appears from the above statement that the Examiner holds that any article formed by impregnating a fibrous and/or granular substrate with a prepolymer which is chemically curable by any mechanism, by any manner or means of energy, in the presence of any kind of catalyst, initiator, or accelerator would have been prima facie obvious to a person having ordinary skill in the art in view of Arkens' disclosure. The Examiner argues that it would have been obvious to persons having ordinary skill in the art to impregnate or coat any fibrous or granular substrate with any kind of curable prepolymer and then thermally cure that prepolymer composite by any means and mechanism (OA, pp. 4-5).

A conclusion of obviousness must be based on prior art which reasonably suggests the subject matter claimed with a reasonable expectation of success. *In re O'Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988). Arkens' teaching is sadly deficient.

The scope of the Examiner's conclusions based on Arkens' limited disclosure defies common sense. The days when combinations of old materials or old steps were held to be prima facie obvious to a person having ordinary skill in the art without some teaching, motivation, or incentive to combine are long gone. Arkens' method steps, prepolymer, polymerization conditions, polymerization mechanism, and specified kind of catalyst, accelerator or initiator differ significantly from those required by Applicant's claims. Arkens' prepolymer is not a free-radically initiated macromonomer having a polymerizable content of at least one free-radically polymerizable unsaturated group. In fact, Arkens' polymeric polyacid is not a polymerizable unsaturated monomer at all. The Examiner argues that the method Applicant claims would have been obvious to a person having ordinary skill in the art over any and all compositions comprising a known substrate and a known curable prepolymer. Based on no more teaching than presented by Arkens, the Examiner's rejection is improper, is not sustainable, and should be withdrawn.

Rejections of Claims 15-18 under 35 U.S.C. 103 over Arkens in view of Rockrath

Claims 15-18 stand rejected under 35 U.S.C. 103 over Arkens in view of Rockrath (U.S. 6,835,420, issued December 28, 2004)(OA, p. 5, ¶5). The rejection should be withdrawn.

Arkens' deficiencies are not corrected by Rockrath's teaching. In point of fact, persons having ordinary skill in the art reasonably would not attempt to add an epoxy compound to Arkens' curable compositions. Epoxy compounds would react with the polyol component in Arkens' curable compositions containing polyacid, polyol, and phosphorous-containing accelerator. Moreover, persons having ordinary skill in the art reasonably would not seek to add Arkens' phosphate-containing accelerators to free-radically polymerizable unsaturated monomer compositions. Arken's polyacid component reacts with a polyol component by an entirely different mechanism from the method required by Applicant's claims. Arken's curable compositions do not contain a polymerizable content of free-radically polymerizable unsaturated groups. In short, it would have been difficult for a person having ordinary skill in the art to comprehend the manner by which teachings relating to the two patentably distinct kinds of processes could be combined. The rejections should be withdrawn.

Rejections of Claims 10-11, 13-14, 17-18, and 20-27 under 35 U.S.C. 103 over Rockrath

Previously presented Claims 10-11, 13-14, 17-18, and 20-27 stand rejected under 35 U.S.C. 103 in view of Rockrath (WO 01/12736, published February 22, 2001)(OA, p. 7, ¶). Applicant cites and refers to Rockrath (U.S.6,835,420, published December 28, 2004), of record, as the English equivalent. This rejection also should be withdrawn.

Rockrath's coatings may be cured either by heating or by applying actinic radiation with equal success (Rockrath, col. 20, ll. 39-43; col. 21, l. 43, to col. 22, l. 9). Rockrath's coatings are said to be curable by heating or by applying actinic radiation because its coatings

form films having a dry film thickness of from 10 to 100 μm when applied over fiber composites or fiber-reinforced plastics (Rockrath, col. 20, ll. 13-17). Rockrath does not impregnate fibers or coat granules. Rockrath instructs that its coatings are polymerized to form hard, glossy, scratch-resistant finishes (Rockrath, col. 19, ll. 30, to col. 20, l. 17). Rockrath's coatings are formed on fibrous composites or fiber-reinforced plastics to produce hard gloss coatings or finishes. Nowhere does Rockrath teach or reasonably suggest that its coatings may be used to impregnate and/or coat fibrous and/or granular substrates.

Applicant's Specification instructs that the articles formed in accordance with the previously presented method claims cannot be uniformly polymerized by actinic radiation without additional "costly and inconvenient measures" (Spec., p. 2, ll. 8-13). The coatings applied by the method Applicant claims impregnate and/or coat impregnable fibrous and/or penetrable granular substrates. Consequently, when applied to the fibrous and/or granular substrates, Applicant's thermally polymerizable mixtures cannot be uniformly polymerized by application of actinic radiation over the full depth of the coating thickness as is Rockrath's coating. Rockrath's substrates are coated over a impenetrable surface. Rockrath's fibrous substrates may not be impregnated. Rockrath's substrates are not granules which are surrounded and bound by its coating. Applicant's claimed substrates and Rockrath's substrates are completely different. Therefore, the respective mixtures must be cured by completely different methods under completely different conditions.

The Examiner finds that Rockrath's thermally curable coatings comprise a thermally curable coating composition comprising an unsaturated polysiloxane macromonomer (Rockrath, col. 7, ll. 59-63)(OA, p. 8). However, thermally curable does not mean thermally polymerizable via free-radically polymerizable unsaturated group. Rockrath teaches (Rockrath, col. 8, ll. 6-9):

The binders (A) for inventive use contain at least two, particularly at least three, functional groups (a1) which are able to undergo thermal crosslinking reactions with complementary functional groups (b1) in crosslinking agent (B).

Rockrath's table at column 8, lines 25-46, does not suggest that functional groups (a1) and (b1) may be polymerizable unsaturated groups. Rather, the functional groups (a1) and (b1) appear to be complementary crosslinkable groups (Rockrath, col. 8, ll. 25-46).

Rockrath instructs (Rockrath, col. 4, ll. 28-31; emphasis added):

[A]t least one binder (A) contains in copolymerized form at least one olefinically unsaturated polysiloxane macromonomer containing on average per molecule at least 3.0 double bonds.

Thus, to form binder (A), Rockrath must copolymerize an olefinically unsaturated polysiloxane macromonomer with at least one other unsaturated monomer to form a binder (A) having at least two functional groups. Rockrath instructs persons having ordinary skill in the art to cure copolymerized binder (A), however, by crosslinking its functional groups with the functional groups of another added crosslinking agent. Applicant's claimed process of free-radical polymerizing a polymerizable mixture of a multifunctional macromonomer having a polymerizable content of unsaturated groups does not employ a crosslinking agent and does not involve crosslinking. Thermally polymerizing polymerizable macromonomers and thermally crosslinking crosslinkable copolymers are substantially different processes, do not produce the same kind of product, and would not be prima facie obvious over each other. Rockrath's process does not resemble or reasonably suggest the method Applicant claims.

Persons having ordinary skill in the art would have understood from Rockrath's disclosure that Rockrath's thermocuring reaction does not involve polymerization of a polymerizable mixture of a multifunctional macromonomer having a polymerizable content of at least one free-radically polymerizable unsaturated group. Rockrath's thermocuring reactions do not involve polymerization of unsaturated groups at all. Rockrath's thermocuring reactions are crosslinking reactions involving complementary functional groups

(a1) and (b2). Moreover, persons having ordinary skill in the art reasonably would have understood from Rockrath's disclosure that unsaturated multifunctional macromonomers having a polymerizable content of at least one residual free-radically polymerizable unsaturated group selected from the group consisting of an acrylate group, a methacrylate group, a maleate group, a vinyl ether group, a vinyl group, and an allyl group are not conventionally free-radically polymerizable at the temperatures from 50 to 100°C that Rockrath recommends (Rockrath, col. 21, ll. 32-42). In fact, Rockrath teaches away from the polymerization the temperatures required for thermal polymerization in accordance with Applicant's claimed process. Compare heating the substrates to a temperature of 180 to 220°C for polymerization according to Applicant's method Claim 25 with Rockrath's advise regarding crosslinking temperatures (Rockrath, col. 21, ll. 32-42):

Thermocuring takes place advantageously at a temperature of from 50 to 100°C, with a particular preference from 80 to 100°C, and in particular from 90 to 100°C. . . . If substrates are used which have a high thermal load-bearing capacity, thermal crosslinking may also be conducted at temperatures above 100°C. In general it is advisable in this case not to exceed temperatures of 180°C, preferably 160°C, and in particular 140°C.

Rockrath's curable binder (A) is cured by crosslinking via functional groups which are complementary to the functional groups of a crosslinking agent whose presence is required in Rockrath's coating material. Rockrath instructs that its thermally curable coatings may contain a crosslinking agent with a complementary double bond and/or other functional groups to facilitate curing by crosslinking.

Rockrath's thermally curable coating includes both a binding agent (A) and a crosslinking agent (B). See Rockrath's Claim 1. Binding agent (A) must have a sufficient amount of functional groups complementary to the functional groups in the crosslinking agent (B) for curing. Rockrath's curing is not the result of thermally polymerizing a thermally polymerizable unsaturated monomer via free-radical polymerization. When Applicant's macromonomer is thermally polymerized, it reacts with itself because it has a

polymerizable content of at least one free-radically polymerizable unsaturated group. No corresponding reactants with complementary functional groups are required for curing. To the contrary, Rockrath's thermally curable coating is cured by crosslinking and invariably includes at least one crosslinking agent in addition to binder (A). Applicant's monomers are polymerized. Rockrath's polymers are crosslinked.

Rockrath expressly states (Rockrath, col. 7, ll. 57-59 emphasis added), "The binders (A) for inventive use may contain the polysiloxane macromonomers in copolymerized form in widely varying amounts." In Rockrath's Examples 1-6 (Rockrath, col. 24, ll. 15-43), there are described methods for preparing "Polyacrylate (A). Rockrath's methods for preparing "Polyacrylate (A)" demonstrate that Rockrath's binder (A) contains copolymerized polysiloxane macromonomer. Rockrath teaches (Rockrath, col. 24, ll. 25-36; emphasis added):

[A] monomer mixture of 597 g of ethylhexyl acrylate, 173.2 g of hydroxyethyl methacrylate, 128.4 g of styrene, 385.2 g of 4-hydroxybutyl acrylate and 3.2 g of a hexaacrylate-functional polysiloxane macromonomer (methylsilo resin Tege® LA-S 517 . . .) was metered into the reactor at a uniform rate over the course of 4 hours and an initiator solution . . . was metered into the reactor at a uniform rate over the course of 4.5 hours.

For Examples 1-6, Rockrath used the copolymer produced by free-radical copolymerizing the aforementioned monomeric mixture as its binder (A), i.e., Polyacrylate (A). There is no factual basis whatsoever in Rockrath for the Examiner's finding that Rockrath's binder (A) contains unpolymerized polysiloxane macromonomer having a polymerizable content of free-radically polymerizable unsaturated groups.

The Examiner finds that curing is curing regardless whether it is carried out thermally or by application of actinic radiation. That finding is clearly erroneous. The Examiner finds that curing is curing regardless whether the coating being cured is applied to a smooth surface or fibrous or granular surface. That finding is clearly erroneous. The Examiner finds that curing is curing regardless whether Applicant cures by polymerization of an unsaturated

macromonomer and Rockrath cures by crosslinking a polymer. That finding is clearly erroneous. The Examiner finds that curing is curing regardless of the temperature at which curing occurs. That finding is clearly erroneous. The Examiner finds that Rockrath's curing involves polymerization of an unsaturated macromonomer regardless of the fact that Rockrath's examples prove otherwise. That finding is clearly erroneous.

Rockrath reasonably would not have suggested the method Applicant claims to a person having ordinary skill in the art. In view of all the evidence in Rockrath which teaches away from the method Applicant claims, the Examiner should withdraw the rejections under 35 U.S.C. 103 over Rockrath's instructions.

For the reasons stated, all the Examiner's rejections should be withdrawn. Applicant's currently amended Claims 10-11, 13-18, and 20-27 are in condition for allowance. Early notice of allowance is earnestly requested.

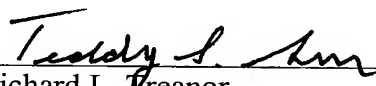
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